**A GLOBAL LUNAR CRATER DATABASE, COMPLETE FOR CRATERS ≥1–2 KM, IV.** S.J. Robbins*,[1]. [1]Southwest Research Institute, 1050 Walnut Street, Suite 300, Boulder, CO 80302. *stuart@boulder.swri.edu

**Introduction and Background:** Crater catalogs for Earth's moon have been developed for over 400 years. Catalogs have tended to focus on non-uniform efforts of more important features rather than generating a complete census [*e.g.*, 1,2]. A few recent efforts were uniform [3-5], though larger cataloging efforts lately have been automated [5-6]. Recent catalogs are somewhat limited in utility due to "small" numbers of features, representing craters with diameters $D \geq 20$ km [3,4], $D \geq 8$ km [5], or $D = 5$–$20$ km [7].

I have developed a global lunar crater database with the goal of a complete census of all impact craters as small as 1 km in diameter. This makes it comparable to a global database of Martian impact craters [8]; it has historical significance because the lunar crater chronology – and by extension, crater chronology throughout the solar system – is defined for $N(1)$ (the spatial density of impact craters with diameters $D \geq 1$ km); and it is to a diameter where the sheer number of impacts can inform numerous lunar processes that were not previously investigable.

**Crater Mapping Process and Data Used:** This manual effort follows that used for the global Martian crater database [8,9]. Craters are manually identified and the rims traced in *ArcMap* software such that many points define the rim (5 to 8,088). Rim traces are imported to *Igor Pro* where custom algorithms correct for all projection effects using Great Circles (lengths and bearings) [10] and fit both a circle and ellipse, saving the location, diameter, and ellipse properties.

Data used started with *Lunar Reconnaissance Orbiter* (*LRO*) Wide-Angle Camera (WAC) 100 m/px "morphometric," "dawn" nearside, and "dusk" farside mosaics. Next, *LRO* Lunar Orbiter Laser Altimeter (LOLA) Gridded Data Record (GDR) at up to 10 m/px near the lunar poles were used globally, with the 60 m/px LOLA-tied SELENE DTM for ≤|±60°|. Targeted regions used the *Kaguya* 20 m/px Terrain Camera (TC) mosaics ("map," "morning," and "evening"). The 2013 TC mosaics were poorly constrained to the current lunar geoid, and so small corrections must be applied based on WAC mosaics.

**Progress & Implications:** I will present this **>2 million crater** database and implications for saturation, spatial density, and secondaries at the NESF.

**References:** [1] Arthur, *et al.* (1965). [2] Losiak, *et al.* (2009). LPSC 40 #1532. [3] Head, *et al.* (2010) doi: 10.1126/science.119505. [4] Fassett, *et al.* (2012) doi: 10.1029/2011JE003951. [5] Salamunićcar, *et al.* (2012) doi: 10.1016/j.pss.2011.09.003. [6] Wang, J. *et al.* (2015) doi: 10.1016/j.pss.2015.04.012. [7] Povilaitis *et al.* (in press) doi: 10.1016/j.pss.2017.05.006. [8] Robbins, S.J. and B.M. Hynek (2012a) doi: 10.1029/2011JE003966. [9] Robbins, S.J. *et al.* (2014) doi: 10.1016/j.icarus.2014.02.022. [10] Vincenty, T. (1975).

**Funding:** Maryland Space Grant award for CosmoQuest support, *Lunar Reconnaissance Orbiter* LAMP instrument as a Project Scientist, NASA SSERVI Award "ISET" to Southwest Research Institute NNH13ZDA006C, and NASA SSW Award NNX15AH97G.